

**Performance Management  
Setting 2020 Targets Status and Process  
Agenda Item #5**

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**Proposed Action:** Briefing

**Summary:** The Puget Sound Partnership is responsible for adopting ecosystem recovery targets to guide recovery efforts and to assess progress toward recovery. To this end the Partnership is adopting 2020 targets (i.e., desired conditions for the year 2020) for many of its dashboard of ecosystem indicators and for reductions in key ecosystem pressures. These ecosystem recovery targets are Partnership policy statements that reflect the region's commitments to and expectations for recovery, or a trajectory toward recovery, by 2020 based on scientific understandings of the ecosystem.

Based on technical background information developed through March 2011, the Partnership staff will work with implementing agencies and stakeholders to identify and evaluate options for targets for Dashboard indicators and key pressure reductions in April and May 2011. A series of workshops to advance this work are planned for April and May. The Ecosystem Coordination Board (ECB) will discuss options for targets at a special meeting set for May 24 and 25, 2011. The Salmon Recovery Council (SRC) will discuss options for the targets most related to salmon recovery at their meeting on May 26. The Partnership's Leadership Council will adopt ecosystem recovery targets at their June 16 and 17 meeting.

**Background:**

Through Partnership meetings in 2010 and early 2011, Partnership has will develop targets for:

- *Ecosystem component targets:* These targets describe desired future conditions of human health and wellbeing, species and food webs, habitats, water quantity, and water quality. In 2011, the Partnership will adopt targets for many of our [Dashboard of Ecosystem Indicators](#) and for acres of restored estuary.
- *Targets for reducing pressures on the ecosystem:* These targets describe desired reduction in the level of pressure from sources of stress. In 2011, the Partnership will adopt pressure reduction targets for land development, shoreline alteration, stormwater, and wastewater.

Performance targets for these topics will guide revisions to Action Agenda implementation strategies, the priority of near-term actions, recommendations for allocation of funding and other resources to specific strategies and actions, and the evaluation of the success of Action Agenda implementation. The Partnership intends that other implementing agencies will use these targets to identify and design activities that contribute to achieving these targets, to align their allocation of funding and other resources to these outcomes, and to evaluate the effects of their investments and activities.

At their February 2011 meeting, the Leadership Council adopted ecosystem recovery targets for two Dashboard indicators: eelgrass and shellfish beds restored.

Indicator Champions and interdisciplinary teams convened by Partnership staff have completed draft technical analyses to support target setting for 13 more Dashboard indicators and for four key pressures on the ecosystem. Reports presenting these analyses are available for [download from the Partnership's web site](#). Summaries of the draft target options are attached.

The process for engaging implementing agencies and stakeholders in discussions of the ecosystem recovery targets for the Puget Sound Partnership is outlined in an attachment to this memo. Concurrent with the engagement, the Science Panel will be completing a screening and more thorough evaluation of the scientific basis for target setting for each of the target setting topics.

**Analysis:** Per RCW 90.71.310(1)(c), "The action agenda shall include near-term and long-term benchmarks designed to ensure continuous progress needed to reach the goals, objectives, and designated outcomes by 2020." Per RCW 90.71.280(3), "the [leadership] council shall confer with the [science] panel on incorporating ... benchmarks into the action agenda."

The Partnership has applied the term "targets" to refer to long-term benchmarks designed to ensure progress to designated outcomes by 2020.

**Next Steps:**

1. Science Panel members review technical materials and the Panel discusses these materials at their April 12 and May 10 and 11 meetings.
2. Partnership staff convenes target setting workshops on April 14, 18, 19 and May 12 and 13 (as described in attached materials) to hear about implementer and stakeholder issues, concerns, and perspectives on options for ecosystem recovery targets. May workshops will develop at least 4 viable options for each target topic
3. ECB meets on May 24 and 25 to discuss members' perspectives on the target options. Salmon Recovery Council meeting on May 26 will include discussion of some of the target topics.
4. Leadership Council adopts targets on June 16 and/or 17, 2011.

**Attachments:**

- Summary of Target Options for Pressure Reductions
- Target Workshops April and May 2011

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## ***Technical Perspectives***

***on***

## ***Options for Setting 2020 Recovery Targets for the Puget Sound Ecosystem***

**March 2011**

**Summary prepared by Scott Redman, Puget Sound Partnership staff**

The Puget Sound Partnership's Leadership Council will adopt ecosystem recovery targets in June 2011 as a key feature of the 2011 revision of the Action Agenda. For the Puget Sound Partnership, ecosystem recovery targets are policy statements that reflect the region's commitments to and expectations for recovery, or a trajectory toward recovery, by 2020 based on scientific understandings of the ecosystem.

Tables 1 through 16 summarize the options for target setting specified in March 2011 DRAFT target setting brief sheets authored by "indicator champions" and technical reports authored by Puget Sound Partnership staff and interdisciplinary teams of advisors or co-authors. The list of briefsheets and reports is provided at the end of this document. These materials are subject to revision; they are being reviewed by the Science Panel in April and May 2011.

The objectives recommended and identified in March 2011 materials were developed to provide the basis for spring 2011 conversations about ecosystem recovery targets.

- An April 14 Workshop (in Tacoma) will discuss the indicators and target options presented in tables 1 through 5: land development, land use, salmon, toxics in fish, water availability, and programmatic topics.
- An April 18 workshop (in Tacoma) will discuss the indicators and target options presented in tables 6 through 11: pollution prevention and control and water quality topics.
- An April 19 workshop (in Olympia) will discuss the indicators and target options presented in tables 12 through 16: marine and nearshore species and habitats topics.

Please consider and use these objectives as draft, technical perspectives available to launch discussions of ecosystem recovery targets.

**Table 1. Overview of Land Use/Land Cover and Land Development Indicators and Objectives**

<b>Indicators - Ecosystem Condition</b>	<b>Recommended Objectives (related to “very good” conditions)</b>
Forested Lands not in Federal Ownership (Land Use/Land Cover Dashboard Indicator)	By 2020, average annual loss of forested land cover is 0%
<b>Indicators - Pressure Reduction</b>	<b>Recommended Objectives (related to “very good” conditions)</b>
1. Percentage of land area within “Protection” and “Restoration” watershed analysis units that is converted to a developed land cover.	By 2020, no more than 1% of land area within “Protection” watershed analysis units and no more than 2% in “Restoration” watershed analysis units is converted to a developed land cover.
2. Proportion of basin-wide population increase occurring within UGAs.	By 2020, 90% of Sound-wide population growth occurs within UGAs. (80%, 77, <77%)
3. Ratio of Land Conversion to Population Growth.	By 2020, the ratio of land conversion to population growth is not more than 0.1%.

**Table 2: Overview of Target Options for Chinook Salmon Abundance**

<b>Indicator</b>	<b>Recommended target options</b>
Chinook salmon abundance	<b>Option 1:</b> Maintain current abundance – This option assumes that improvements in salmon abundance will not occur within the 2020 timeframe because 1) populations will not have had enough time to respond to the restoration and protect of habitat and hatchery actions that have already been completed or currently being undertaken, and 2) overall harvest rates (including any future adjustments for killer whales to harvest more Chinook salmon) remain constant. This has relative low scientific uncertainty.
	<b>Option 2:</b> A statistically significant increase – This option is a directional target, similar to the target already adopted by the Leadership Council for eelgrass. It is based on the amount of increase needed to detect an improvement given historical variability. This has more scientific uncertainty than Option 1 because it does not consider spatial variation, but overall it has relatively low scientific uncertainty.
	<b>Option 3:</b> Where we need to be on a presumed trajectory – This approach assumes the ESA recovery planning ranges were 2050 targets. It assumes a presumed trajectory for recovery and uses that relationship to calculate where we would need to be in 2020 to be able to be recovered by 2050. This has relative high scientific uncertainty.

**Table 3: Overview of Target Options for Toxics in Fish**

Indicator	Recommended target options
<p>Toxic chemicals in fish</p> <p><i>Caveats from briefsheet: (1) a thorough review of existing effects thresholds, both to recover fish health, and to protect human health is needed and (2) a dedicated effort to evaluate these options is needed to develop a proper science perspective for Puget Sound recovery.</i></p>	<p>1. <u>Protect human health</u>. Select a recovery target for fish tissue concentrations that balances acceptable risk to human health with a provision for maintaining a sufficient level of ecosystem services in the form of subsistence, recreational, and commercial fishing. Alternatively, human-health-related recovery could refer to the consumption advisories published by the Washington Department of Health, (or other States or entities) selecting tissue residue targets for contaminants that would allow an acceptable level of consumption determined by policy.</p>
	<p>2. <u>Recover fish health (indirect)</u>. Select targets based on critical body residues or environmental concentration as a proxy for a more difficult to measure toxicity or disease. Could use, for example, published PCB concentration-effects threshold (for juvenile salmonids) or sediment PAH threshold that could protect bottomfish from PAH-related diseases, including reproductive impairment.</p>
	<p>3. <u>Recover fish health (direct)</u>. Recovery targets could be based on direct observations of fish health. Johnson et al. (2008) observed reproductive anomalies in Puget Sound English sole that were thought to be related to their exposure to endocrine disrupting compounds from human waste water (possibly originating from combined sewer overflow events). Baseline conditions for healthy English sole reproduction are well known and could serve as recovery targets.</p>
	<p>4. <u>Recover health of apex predators</u>. Targets could be set to recover the health of apex predators by reducing their exposure to contaminants from their prey. Reducing bioaccumulative contaminants in organisms in the lowest level of Puget Sound's food web could ultimately reduce magnification of those chemicals through the food web to apex predators, and serve as an easy-to-measure, shorter-term proxy for conditions in higher predators, which are difficult to sample and change over a long period. Setting a recovery target based on PBT tissue residues in Pacific herring could serve this purpose.</p>
	<p>5. <u>Compare conditions</u>. Targets could be set to reduce contaminant levels, in the form of tissue residues or health measures, to reasonable or desirable "background" levels. Background levels could be determined by evaluating Puget Sound fish living in less polluted areas or by a comparison with other aquatic systems world-wide that exhibit desirable conditions.</p>

**Table 4: Overview of Target Options for Water Availability – Low Summer Stream Flow**

Indicator	Recommended target options
<p>Water availability (low summer stream flow)</p>	<p>1. Adopt the existing target from the Governor's GMAP: "all thirteen major rivers and streams to either have no trend or increasing 30-day average summer low flows"</p>
	<p>2. Adopt targets for each individual river to either maintain or increase flows within a time frame unique for each watershed.</p>
	<p>3. Establish the Stream Low Flow Trend target(s) on an interim basis, and in addition either:</p> <ul style="list-style-type: none"> <li>a. Enhance the indicator by identifying flow level targets for each river or stream to go with the trend targets; or</li> <li>b. Develop a flow indicator index that better quantifies the diverse hydrologic requirements of healthy aquatic ecosystems.</li> </ul>

**Table 5: Overview of Target Options for Programmatic Indicators**

Indicator	Recommended target options
Funding for Puget Sound	1. <b>Maintain current levels of funding.</b> This target reflects the current economic situation but would not allow significant progress in meeting anticipated pressure reduction and dashboard indicator targets.
	2. <b>Increase funding from all sources by 10% a year.</b> This target would provide some significant new resources for Puget Sound projects and activities and result in additional progress. This increase in funding would likely exceed the rate of inflation and result in additional real dollar investments. By 2020 this would result in an increase of 120% increase in funding from the FY 2010 level. However, it is unlikely that local governments would be able to generate this large of a revenue increase on a consistent basis. State and federal governments would also be seriously challenged to increase spending at this rate.
	3. <b>Increase state funding and federal funding passed through to the state by 5% a year.</b> This target would increase state and federal funding passed through to the state by 70%. In 2020 this would increase funding through state agencies from \$209 million a FY 2011 to \$361 million in FY 2020. This would not meet the \$500 million a FY estimated by state agencies to implement the current version of the Action Agenda and would not provide for greater progress than the current approach.
	4. <b>Develop a target based upon outcomes of other target setting work.</b> This approach would allow a more focused target setting based upon the other targets set by the Leadership Council. This approach would set a schedule for establishing this target at the August Leadership Council Meeting, rather than in June.
Action Agenda engagement	1. <b>100% of all NTAs are on-plan or completed.</b> This reflects the current GMAP target and is considered the target for completely ideal circumstances.
	2. <b>90% of all NTAs are on-plan or completed.</b> This target reflects the fact that no matter how much planning and review goes into Action Agenda development, there will always be actions that for a host of valid reasons (e.g., a better approach was identified, other circumstances make the NTA obsolete) are not launched as written. It may not be appropriate to identify these as failures to implement the Action Agenda, but instead can reflect effective adaptive management.
	3. <b>80% of all NTAs are on-plan or completed.</b> This target reflects the adaptive management consideration, above, but also takes into account the current uncertainties due to budget conditions.
	4. <b>100% of all <i>funded</i> NTAs are on-plan or completed.</b> This is another option for taking into account both the adaptive management and funding considerations. NTAs that are only partially funded will have to be addressed on a case-by-case basis under this scenario.
	5. <b>Assign NTAs to high-risk and low-risk categories, based on complexity and funding issues: X% of high-risk NTAs are on-plan or completed, X% of low-risk NTAs are on-plan or completed.</b> This option would provide for a richer analysis of Action Agenda engagement, but would require the partners to agree on the assignments of risk to each NTA.

**Table 6. Overview of Runoff from the Built Environment Indicators and Objectives**

<b>Ecosystem Condition</b>	<b>Possible Objectives</b>
Restore flows in small streams	By 2020 20%, or 35%, or 50% of 2nd and 3rd order (wadeable) streams within urban growth areas (UGAs) that are monitored exhibit flows closer to natural conditions.
Restore biological health of small streams	By 2020, 20%, or 35%, or 50% of all 2nd and 3rd order (wadeable) streams monitored within UGAs show improved BIBI scores to the point where they are rated in a higher (healthier) category.
Prevent salmon pre-spawn mortality	By 2020, there is a 50%, or 75%, or 100% reduction in pre-spawn mortality above natural levels in streams or creeks in urban growth areas.
Prevent contact recreational advisories and shellfish restrictions	By 2020, there are no contact recreational advisories or shellfish restrictions within UGAs caused by urban stormwater runoff.
<b>Pressure Reduction</b>	<b>Potential Objectives</b>
Upgrade inadequate infrastructure	By 2020, high priority sites equaling 5%, or 10%, or 20%, of acres of impervious area built prior to 1992 are retrofitted or redeveloped with current level stormwater controls for treatment, and flow control where applicable.
Maintain infrastructure	By 2020, 90%, or 100%, of public and private stormwater facilities are regularly maintained to function to engineering design standards.

**Table 7. Overview of Wastewater Indicators and Objectives -- *summarized from working draft not yet available for review***

<b>Pressure Reduction</b>	<b>Potential Objectives</b>
Proper operation of on-site systems in sensitive areas	By 2020, 90% of on-site systems in Marine Recovery Areas are inventoried, monitored and maintained to assure proper operation and reduction of fecal bacteria from this source
On-site systems do not prohibit or unreasonably restrict harvest in commercial shellfish growing areas	By 2020, 50% reduction in number of areas closed to shellfish harvest due to on-site systems from baseline Department of Health survey conducted in 2011
Control human sources of nitrogen to maintain sufficient oxygen for marine life	By 2020, human contributions of nitrogen do not result in 0.2 mg/L reductions in dissolved oxygen levels in Puget Sound.

**Table 8. Overview of Target Options for Toxics in Sediment**

Indicator	Recommended target options
Toxic chemicals in sediment	<p>Option 1 - Highest Quality (preferred)</p> <p>1a. Sediment Chemistry Index (SCI) Target. Chemistry measures reflect “minimum exposure”: mSQS is &lt;0.1 and the SCI is &gt;93.3</p> <p>1b. Sediment Quality Triad Index (SQTI) Target: composite triad sediment quality triad measures reflect “unimpacted” conditions: SQTI values &gt;83</p>
	<p>Option 2 – Second-Tier Quality</p> <p>2a. SCI Target. Chemistry measures reflect low levels of exposure: mSQSq is 0.1 - &lt;0.3 (corresponding SCI = &gt;80 - 93.3); most of these samples have one chemical exceeding its sediment quality standard (SQS) value.</p> <p>2b. SQTI Target. composite SQTI measures reflect “likely unimpacted” conditions: SQTI values from &gt;57 - 83.</p>
	<p>Option 3 – status quo or better – A third option would be to set “starting” target values to maintain or improve upon “status quo” for both indices. The SCI and SQTI values generated for the Puget Sound sediment baseline samples collected from 1997-2003 would be set as minimum values. These target values would be set for the initial target time frame. Higher target values (i.e., Options 1 or 2) would be set during later target time frames. This option is functionally equivalent to Option 2, as current status quo meets the Option 2 criteria.</p>



**Table 9. Overview of Target Options for Freshwater Quality Index**

Indicator	Recommended target options
<p>Freshwater quality</p> <p><i>Note from briefsheet: The recommendations refer only to the single number indicator for all of Puget Sound. The final presentation could include different ways to aggregate or drill-down into underlying index values for "Puget Sound," "Small Urban Streams," "WRIAs," "Salmon Recovery Regions," "Individual Stations," and "Parameters" (by region or by station). The final target should be the same for all the different possible roll-ups, but different time frames could be set for meeting the targets.</i></p>	<p><i>Average of scores from 14 major rivers in 12 basins. This is the recommended indicator. <b>Suggested Target: 80.</b></i></p> <p>Provides an indication of current region-wide status and the annual change illustrates region-wide trend. Most stations are near the mouths of major rivers in each WRIA and the indicator aggregates all upstream conditions. Trends are statistically defensible. Attaining an average score of 80 by 2020 in major Puget Sound rivers will be challenging.</p>
	<p><i>Percentage of stations demonstrating stable and increasing/improving trends in Freshwater Water Quality Index scores. <b>Suggested Target: 100%.</b></i></p> <p>Illustrates region-wide trends in water quality with much more sensitivity than a trend in average score and it permits including any long-term monitoring station, not just major stations (n~30). Consistent with the indicator proposed for water quantity. Defining stable scores as meeting targets allows streams with poor water quality to still meet the target.</p>
	<p><i>Percentage of stations with Freshwater Water Quality Index scores <math>\geq 80</math>. <b>Suggested Target: 50%</b></i></p> <p>Summarizes the status of individual stations. All stations for which data are available could be included (n&gt;45), but because stations change each year, trends could not be reported. If only including long-term stations on major rivers (n=14) or major rivers plus urban stream (n~30), then trends would be meaningful and this could be used in lieu of the "average score" method but this indicator would be highly insensitive to trends. Ultimately, 100% of stations should attain index scores &gt; 80; however a target of 50% will be difficult enough to achieve by 2020.</p>

**Table 10. Overview of Target Options for Marine Water Quality Index**

Indicator	Recommended target options
Marine water quality	<p><b>Suggestion 1: Sustained target index score of: "0"</b></p> <p>This assumes steady state of conditions we encountered from 1999-2008. The numbers are very well defined. Considering the anticipated population increase, maintaining status quo appears a valid approach along the axis of the urban corridor. The target is a product of ten years of local monthly monitoring observations that have taken seasonal variability, natural environmental gradients and a stations history into account.</p>
	<p><b>Suggestion 2: Sustained target index score of: "&gt;0"</b></p> <p>Sustained scores above zero imply that conditions have gotten better in a qualitative sense. It does not specify the overall improvement of water quality conditions. The goal appears to be achievable and is robust to inter annual-variation.</p>
	<p><b>Suggestion 3: Sustained target index score of: "0 &gt; target index score &lt;20"</b></p> <p>The selection of a specific index score greater than zero should be based on regional criteria. Target scores above 20 are generally not recommended because of range issues of nutrient concentrations during summer. South Sound has periods of severe nutrient drawdown during summer. These concentrations are at the analytical detection. No significant improvements can be expected for these regions. An improvement of +50 is therefore unrealistic.</p>

**Table 11. Overview of Target Options for Swimming Beaches**

Indicator	Recommended target options
Swimming beaches	<p><b>Option A:</b> 95% of core Puget Sound swimming beaches meeting water quality standards by 2020.</p> <p>With pollution identification and correction efforts, nearly all beaches should meet water quality standards and be free of pathogens. However, a few beaches identified as core swimming beaches have permanent infrastructure that will likely make it impossible for them to consistently meet standards.</p>
	<p><b>Option B:</b> 95% of all monitored Puget Sound swimming beaches meeting water quality standards by 2020.</p> <p>As with option A, nearly all beaches have the potential to meet water quality standards and be free of pathogens. There is a concern that if we limit the target to identified core beaches, this will encourage all efforts to be focused solely on core beaches. There are other beaches that we know are serious risks to public health that are not monitored regularly because they are known to be contaminated and we notify the public of this risk. When we know a beach is a risk to public health, often it doesn't make sense to monitor it.</p> <p>With these things in mind, we propose option B that does not limit to core beaches. To determine if the target was met or not you would determine for each beach that was sampled at least three years in the 2014-2020 timeframe, whether it met standards for each year. If it met the most recent three years of sampling, consider that beach as "meeting water quality standards". Without funding to monitor additional beaches every year this option is not suitable for a trend analysis.</p>
	<p><b>Option C:</b> Complete pollution investigations and remediation at the ten beaches with the most frequent exceedances by 2020.</p> <p>This option also does not limit monitoring to core beaches. At these 10 beaches, we are most likely to be able to identify sources of pollution and measure improvements in water quality. The beaches also present the biggest health risk to the public. This option pinpoints specific beaches and allows for a clear goal and clear plan to accomplish it.</p>

**Table 12. Overview of Estuaries, Nearshore Restoration and Shoreline Alteration Indicators and Objectives**

Indicator	Possible Objectives
Estuary restoration extent	<ul style="list-style-type: none"> <li>By 2020, over 80% of historic estuary extent restored basin-wide</li> </ul>
	<ul style="list-style-type: none"> <li>By 2020, 80% of restoration need in major river deltas is achieved basin-wide</li> </ul>
	<ul style="list-style-type: none"> <li>By 2020, 30% of restoration need is achieved basin-wide, and at least 15% of restoration need is achieved in all watersheds</li> </ul>
	<ul style="list-style-type: none"> <li>By 2020, 15% of restoration need is achieved basin-wide and all natal river deltas meet 10-year salmon recovery goals (or 10% of restoration need as proxy for river deltas lacking quantitative acreage goals in salmon recovery plans)</li> </ul>
	<ul style="list-style-type: none"> <li>By 2020, all Chinook natal river deltas meet identified 10-year salmon recovery restoration goals (or 10% of restoration need as proxy for other goals)</li> </ul>
	<ul style="list-style-type: none"> <li>By 2020, salmon recovery goals are not met in all Chinook natal river deltas</li> </ul>
Shoreline armoring (Dashboard Indicator)  <i>Note from briefsheet: could create combination across these options</i>	<p><b>Option 1. Reduction in rate of new armoring:</b></p> <ul style="list-style-type: none"> <li>By 2020, the amount of new armoring is equal to the amount of armoring removed within Puget Sound (no net gain of armoring)</li> <li>By 2020, the annual rate of new armoring is reduced by 50%</li> </ul>
	<p><b>Option 2. Reduction of total armoring in Puget Sound:</b></p> <ul style="list-style-type: none"> <li>By 2020, the total amount of the armoring in Puget Sound has decreased by X miles (length of armoring removal minus length of new armoring is equal to or greater than X miles)</li> <li>By 2020, the percent of Puget Sound that is armored is reduced by 10%</li> </ul>
	<p><b>Option 3. Reduction in armoring for specific areas (geographic areas, feeder bluffs):</b></p> <ul style="list-style-type: none"> <li>By 2020, annual rate of armoring in [X number of] counties is reduced by 50%</li> <li>By 2020, the amount of armoring on feeder bluffs is decreased through a reduction of new armoring and the through removal of armoring</li> </ul>
	<p><b>Option 4. Increase use of softshore armoring approaches:</b></p> <ul style="list-style-type: none"> <li>By 2020, new and replacement armoring use softshore approaches</li> </ul>
Riparian cover along lake shorelines	<ul style="list-style-type: none"> <li>By 2020, riparian land cover for XX% of Puget Sound lake shorelines meets land use/land cover objectives</li> </ul>
Overwater structures	<ul style="list-style-type: none"> <li>Total area of overwater structures reduced: By 2020, aerial extent of overwater structures in marine, estuarine and freshwater systems decreases by XX%.</li> </ul>
	<ul style="list-style-type: none"> <li>Total number of overwater structures: By 2020, the total number of overwater structures is reduced by XX%.</li> </ul>
	<ul style="list-style-type: none"> <li>New overwater structures meet best practices for design standards: By 2020, XX% of newly built, replaced, or upgraded overwater structures should meet best practices for design standards.</li> </ul>

**Table 13. Overview of Target Options for Recreational Fishing Permits**

Indicator	Recommended target options
Recreational fishing permits	Option 1: Define the indicator as the percentage of residents of the counties bordering Puget Sound that purchase licenses for use in the sound (using the combined fish/crab sales as defined above.) Set the target to a percentage that reflects participation during a time when fishing was perceived as “good.” <i>It may be difficult to calculate equivalent license sales from decades past. The choice of a “golden age” of Puget Sound fishing will be subjective.</i>
	Option 2: Define the indicator as above; define the target to a percentage set a fixed amount above the average for a recent series of years, e.g. 15% higher than the average sales for 2001-2005. <i>This option will be easier to implement. Choice of both the range of years and the percentage increase will be somewhat arbitrary.</i>
	Option 3: Set the target using one of the above two schemes, but define the indicator as the percentage of residents of the entire state purchasing Puget Sound licenses. <i>Including anglers from farther away will provide some measure of the attractiveness of the sound as an angling destination. There is some risk that the measure will be affected by differences in population growth in other areas of the state.</i>
	Option 4: Adopt one of the above targets, but use only fishing license sales, excluding the crab endorsements. <i>Crab license sales are difficult if not impossible to separate out before 2004, and excluding them will simplify calculation of the indicator. However, crabbing is an increasingly popular component of the Puget Sound fisheries.</i>

**Table 14. Overview of Target Options for Southern Resident Orcas**

Indicator	Recommended target options
Orcas	1. By 2020, meet all biological criteria for downlisting Southern Resident orcas. This would include a 14-year period with annual average population growth of 2.3 percent, which would require a 2020 census of 125 or 124 individuals (depending on whether a 2001 or 2006 baseline – 81 and 90 individuals, respectively – is used as the basis for the 14-year period).
	2. By 2020, demonstrate progress toward biological criteria for downlisting Southern Resident orcas by achieving 2.3 percent annual average population growth for fewer than 14 years and meet threats criteria for downlisting. Achieving a 2.3 percent annual growth from the 2010 baseline of 86 individuals would require a 2020 end of year census of 108 individuals.
	3. By 2020, meet threats criteria for delisting Southern Resident orcas
	4. By 2020, meet threats criteria for downlisting Southern Resident orcas

**Table 15. Overview of Target Options for Pacific Herring**

Indicator	Recommended target options
Pacific herring	<p>1. Simple approach basing target on mean of total estimated herring spawning biomass for all stocks combined since 1976; could calculate mean based on sampled stocks only which underestimates due to varying sample effort, or use historical mean to account for decreased sampling effort prior to 1996. Previous herring stock status assessments have considered a stock to be healthy if previous 2 year mean spawning biomass is within 10% of long term mean. This would provide a target of <b>15,868</b> tons (historical mean assumed if stock not sampled) or <b>13,507</b> tons (mean based only on sampled stocks). Least preferable option mainly due to lack of consideration of stock discreteness identified to date. Current ongoing WDFW activities meet the minimum requirement of annual spawning biomass estimates using spawn deposition surveys only.</p>
	<p>2. Similar approach as #1 above, but calculate separate targets based on mean of annual cumulative estimated herring spawning biomass since 1976 by region or stock based on stock identification/genetic studies; results in targets of: Cherry Point stock (<b>4,590</b> tons); Squaxin Pass stock (<b>681</b> tons); cumulative north Puget Sound region excluding Cherry Point stock: <b>2,184</b> tons (historical mean assumed if stock not sampled) or <b>1,803</b> tons (mean based only on sampled stocks); cumulative south/central Puget Sound excluding Squaxin Pass stock: <b>7,699</b> tons (historical mean assumed if stock not sampled) or <b>6,279</b> tons (mean based only on sampled stocks); and cumulative Straits stocks: <b>984</b> tons (historical mean assumed if stock not sampled) or <b>928</b> tons (mean based only on sampled stocks). Preferable to #1 due to consideration of stock identification results. However, it assumes that mean calculated spawning biomass since the 1970's is an accurate indicator of the health of herring stocks in Puget Sound without any biological basis. Current ongoing WDFW activities meet the minimum requirement of annual spawning biomass estimates using spawn deposition surveys only.</p>
	<p>3. Set Cherry Point stock target at minimum level for harvest to be considered (3,244 tons). Use available biological data (i.e. age data from acoustic/trawl surveys) to calculate appropriate targets for other stocks/regions based on these data. This is the preferred option but would require additional funding for future analyses and resumption of acoustic/trawl surveys. Egg samples can be collected during ongoing spawn deposition surveys and archived for later analysis in anticipation of future funding.</p>
	<p>4. Use advanced demographic models to identify the biomass of herring to keep the population at maximum sustainable yield. Biomass levels may be well below unfished or current spawner biomass, but could be set at different levels depending upon the productivity of the herring population (Cleary et al. 2010).</p>
	<p>5. Use the food web model developed by Harvey et al. (2010) for the central basin and expanded to other basins to identify the predator needs of the ecosystem and use model results as a threshold for adult herring biomass. Predators require almost 8,200 mt of juvenile herring and 2,500 of adult herring per year in the central basin. The model would need to be expanded to reflect demographic and interannual variation of herring and other predators and prey in the system.</p>

**Table 16. Overview of Target Options for Birds**

Indicator	Recommended target options
Birds	<ul style="list-style-type: none"> <li>• Use the recovery target in the federal Recovery Plan (USFWS 1997) to stabilize the population at 1997 levels as discussed in # 3 above (population target with some associated confidence interval).</li> </ul>
	<ul style="list-style-type: none"> <li>• Stable or increasing population size (trend target) for a 10-year period as indicated in the federal Recovery Plan (USFWS 1997). The current 10 year trend is provided in #1 above and the monitoring program has adequate power to detect a 10 year trend within Puget Sound/Strait of Juan de Fuca zone (80% power or greater to detect a %5 change or greater). This approach should consider the murrelet population reductions already documented.</li> </ul>
	<ul style="list-style-type: none"> <li>• Set targets based on the likely murrelet population response to the projected habitat change predicted within the FEMAT 1993 document. As stated above, murrelet populations were thought to be declining when the Northwest Forest Plan was first developed and declines were expected until habitat recovered from previous losses (Raphael 2006). However, I have not been able to locate any documents that quantitatively link predictions about the projected rates of murrelet and habitat changes that would inform this potential target setting strategy. This approach should address the concerns in McShane et al. (2004) about the assumptions associated with the projected habitat increase (see # 7 above).</li> </ul>
	<ul style="list-style-type: none"> <li>• Set both habitat and population targets using outputs from the Northwest Forest Planning documents and continue to relate habitat and population trends at 5 year intervals (see Huff et al. 2006)</li> </ul>

## Source Materials – DRAFT Technical Memos/Briefsheets<sup>1</sup>

- Land Development – Setting Targets for Pressure Reductions Technical Memorandum; J Leckrone Lee, D Peters, K Pierce, S Stanley, and K Stiles; March 25, 2011 DRAFT
- Conversion of forested to developed cover in non-federal ownerships (Land-use/Land-cover) -- Setting Targets for Dashboard Indicators Briefsheet; KB Pierce, Jr.; March 25, 2011 DRAFT
- Wild Chinook salmon abundance – Setting Targets for Dashboard Indicators Briefsheet; K Currens; March 25, 2011 DRAFT
- Toxics in fish – Setting Targets for Dashboard Indicators Briefsheet; JE West; March 23, 2011 DRAFT
- Water availability Setting Targets for Dashboard Indicators Briefsheet; KB Pierce, Jr.; March 25, 2011 DRAFT
- Funding for Puget Sound – Setting Targets for Dashboard Indicators Briefsheet; J Cahill; March 22, 2011 DRAFT
- Action Agenda engagement -- Setting Targets for Dashboard Indicators Briefsheet; K Boyd, M Daily, A Mitchell, and M Neuman; March 22, 2011 DRAFT
- Runoff from the Built Environment – Setting Targets for Pressure Reductions Technical Memorandum; B Wulkan; March 23, 2011 DRAFT
- Wastewater and On-Site Sewage Systems – Setting Targets for Pressure Reductions Technical Memorandum; D Fagergren; March 30, 2011 *INTERNAL DRAFT – NOT AVAILABLE FOR REVIEW*
- Toxics in sediments – Setting Targets for Dashboard Indicators Briefsheet; M Dutch, E Long S Weakland, V Partridge, and K Welch; March 23, 2011 DRAFT
- Freshwater water quality index – Setting Targets for Dashboard Indicators Briefsheet; D Hallock; March 23, 2011 DRAFT
- Marine water quality composite index – Setting Targets for Dashboard Indicators Briefsheet; C Krembs; March 23, 2011 DRAFT
- Swimming beaches – Setting Targets for Dashboard Indicators Briefsheet; J Bennett; March 23, 2011 DRAFT
- Estuaries, Nearshore Restoration, and Shoreline Alteration – Setting Targets for Pressure Reductions Technical Memorandum; J Mulvihill-Kuntz, M Schneider, and K Stiles; March 23, 2011 DRAFT
- Shoreline armoring – Setting Targets for Dashboard Indicators Briefsheet; R Carman, K Taylor, and H Shipman; March 23, 2011 DRAFT
- Recreational fishing license sales – Setting Targets for Dashboard Indicators Briefsheet; E Kraig; March 22, 2011 DRAFT
- Southern resident orcas – Setting Targets for Dashboard Indicators Briefsheet, S Redman, March 24, 2011 DRAFT
- Pacific herring spawning biomass – Setting Targets for Dashboard Indicators Briefsheet; K Stick and W Palsson; March 22, 2011 DRAFT
- Terrestrial birds – Setting Targets for Dashboard Indicators Briefsheet; S Pearson; March 25, 2011 DRAFT

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<sup>1</sup> These materials can be downloaded from:  
[http://www.mypugetsound.net/index.php?option=com\\_docman&task=cat\\_view&gid=135&Itemid=172](http://www.mypugetsound.net/index.php?option=com_docman&task=cat_view&gid=135&Itemid=172)

## **Setting Ecosystem Recovery Targets – April and May 2011 Workshops**

### **Understanding Implementer & Stakeholder Perspectives – Options for Target Setting**

The Puget Sound Partnership is responsible for adopting ecosystem recovery targets to guide recovery efforts and to assess progress toward recovery. In 2011 the Partnership will adopt 2020 targets (i.e., desired conditions for the year 2020) for many of the Dashboard of ecosystem indicators and for reductions in key ecosystem pressures. These ecosystem recovery targets are policy statements that reflect the region's commitments to and expectations for recovery, or a trajectory toward recovery, by 2020 based on scientific understandings of the ecosystem.

Ecosystem recovery targets will play a key role in the 2011 revisions to the Action Agenda. Targets will guide revisions to Action Agenda implementation strategies and near term actions, the priority of near-term actions, recommendations for allocation of funding and other resources to specific strategies and actions, monitoring, and the evaluation of the success of Action Agenda implementation. The Partnership intends that implementing agencies will use the ecosystem recovery targets to identify and design activities that contribute to achieving these targets, align their allocation of funding and other resources to these outcomes, and evaluate the success of their investments and activities.

**Next Steps:** Based on technical background information developed through March 2011, Partnership staff will work with implementing agencies and stakeholders to identify and evaluate options for targets for Dashboard indicators and key pressure reductions in April and May 2011. A series of workshops will be held to gather additional stakeholder input on targets and target options. (These workshops are described on the following pages.) The Ecosystem Coordination Board (ECB) will discuss options for targets at a special meeting on May 24 and 25, 2011. The Salmon Recovery Council (SRC) will discuss options for the targets most related to salmon recovery at their meeting on May 26. The Partnership's Leadership Council will consider target options and adopt ecosystem recovery targets at their June 16 and 17 meeting.

### **Workshops to Develop Options for 2011 Target Setting**

**April workshops:** Workshops are scheduled for April 14, 18 and 19. The objective of this first set of workshops is to introduce the technical target setting work that has been done by indicator champions and interdisciplinary teams over the past two months and gather additional perspectives on the options for each target. The desired outcomes of these workshops include:

- understanding of the technical basis available to support target setting for each Dashboard indicator and key pressure and
- identification of implementer and stakeholder issues, concerns, and recommendations related to options for individual targets.



Partnership staff will synthesize the April workshop discussions for presentation as a status report to the Leadership Council at their late-April meeting and consider input as target options are refined leading up to the June Leadership Council decision making on targets.

If you would like to participate in the April 14, 18, and/or 19 workshops, please RSVP with your name and affiliation to Kathleen Igros at [kathleen.igros@psp.wa.gov](mailto:kathleen.igros@psp.wa.gov).

#### April 14 – Land Development, Land Use, Salmon, and Programmatic Indicators

9:30am – 4:30pm, Tacoma

Agenda and specific location to be provided at [www.psp.wa.gov](http://www.psp.wa.gov) (click on ‘target setting’)

- Land development<sup>1</sup>
- Land use/land cover
- Chinook salmon abundance
- Toxics in fish
- Funding for Puget Sound
- Action Agenda engagement

#### April 18 – Pollution Prevention and Control, Water Quality, and Water Quantity

9:30am – 4:30pm, Tacoma

Agenda and specific location to be provided at [www.psp.wa.gov](http://www.psp.wa.gov) (click on ‘target setting’)

- Runoff from the built environment
- Wastewater (including sewer systems and on-site sewage systems)
- Toxics in sediment
- Freshwater quality
- Marine water quality
- Swimming beaches
- Shellfish beds restored – adopted February 2011
- Water availability

#### April 19 – Marine and Nearshore Species and Habitats

9:30am – 4:30pm, Olympia

Agenda and specific location to be provided at [www.psp.wa.gov](http://www.psp.wa.gov) (click on ‘target setting’)

- Estuaries and other nearshore systems
- Armoring (and other alteration) of marine and lake shorelines
- Recreational fishing permits
- Orcas
- Pacific herring
- Birds
- Eelgrass – adopted February 2011

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<sup>1</sup> The Partnership will convene a technical discussion in early April 2011 to develop and present target options related to floodplain development, levees, and floodgates. If possible, these options will be included the spring 2011 discussion of target options.

**May workshops:** Workshops are scheduled for May 12 and 13 to further describe and refine target options. The desired outcome of the May workshops is to identify and, if possible, characterize at least four options for each target that can be presented for discussion by the ECB on May 24 and 25 and SRC on May 26. The May meetings also will provide an opportunity to begin to gather initial input on the strategies and actions that might be needed to achieve ecosystem recovery targets.

If you would like to participate in the May 12 and/or 13 workshops, please RSVP with your name and affiliation to Kathleen Igros at [kathleen.igros@psp.wa.gov](mailto:kathleen.igros@psp.wa.gov).

May 12 -- Land Development, Land Use, Pollution Prevention and Control, and Water Quality

9:30am – 4:30pm, Tacoma

Agenda and specific location to be provided at [www.psp.wa.gov](http://www.psp.wa.gov) (click on 'target setting')

- Land development
- Land use/land cover
- Runoff from the built environment
- Wastewater (including sewer systems and on-site sewage systems)
- Toxics in fish
- Toxics in sediment
- Freshwater quality
- Marine water quality
- Shellfish beds restored – adopted February 2011
- Swimming beaches

May 13 – Marine and Nearshore Species and Habitats, Water Quantity, and Programmatic Indicators

9:30am – 4:30pm, Olympia

Agenda and specific location to be provided at [www.psp.wa.gov](http://www.psp.wa.gov) (click on 'target setting')

- Estuaries and other nearshore systems
- Armoring (and other alteration) of marine and lake shorelines
- Recreational fishing permits
- Orcas
- Chinook salmon abundance
- Pacific herring
- Birds
- Eelgrass – adopted February 2011
- Water availability
- Funding for Puget Sound
- Action Agenda engagement